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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,387	08/21/2003	Wei William Lee	TI-26800.1	8080
23494	7590	06/02/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			NOVACEK, CHRISTY L	
			ART UNIT	PAPER NUMBER

2822

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/645,387

**Applicant(s)**

LEE ET AL.

**Examiner**

Christy L. Novacek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to the amendment filed February 28, 2005.

#### ***Response to Amendment***

The amendment to the specification is sufficient to overcome the objection to the specification stated in the previous office action. Therefore, this objection is withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahin et al. (US 6,624,064, previously cited) in view of Raoux et al. (US 6,136,388, previously cited) and Limb et al. ("Flexible fluorocarbon wire coatings by pulsed plasma enhanced chemical vapor deposition").

Regarding claim 1, Sahin discloses using a plasma-enhanced CVD process to polymerize precursors on a surface (412) with gaps to form an amorphous fluorocarbon polymer layer (420) filling the gaps without voids (Fig. 6A-6C; col. 9, ln. 62 – col. 12, ln. 43). The gaps may have an aspect ratio of 3:1 (col. 9, ln. 66). Sahin does not disclose using a pulsed plasma to activate the precursors of the polymer. Like Sahin, Raoux discloses a process of using a plasma-enhanced CVD process to deposit an amorphous fluorocarbon dielectric film between metal line gaps on a substrate surface. Raoux teaches that it is advantageous to use a pulsed plasma to activate the precursors of the film because a pulsed plasma allows a manufacturer to tailor plasma chemistry versus plasma density to improve the film's characteristics (col. 24, ln. 46-64). Raoux teaches

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that this pulsed plasma method is “particularly useful when depositing amorphous fluorocarbon and other low k dielectric films” (col. 24, ln. 61-63). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the pulsed plasma method taught by Raoux to deposit the fluorocarbon film of Sahin because Raoux teaches that a pulsed plasma improves the film’s characteristics.

Raoux does not disclose the duty cycle (ration of ON time versus OFF time) is for the pulsed plasma process. Like Raoux, Limb discloses a method of depositing a fluorocarbon film using pulsed plasma CVD. Limb states that a duty cycle of 10 ms on and 400 ms (ratio of 1:40) can successfully deposit the fluorocarbon layer onto metal wires (pg. 1815, II. Experiment). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a ratio of around 1:40 for the pulsing of the plasma for the fluorocarbon deposition of Sahin because Limb teaches that this ratio can successfully deposit the fluorocarbon. It noted that Applicant’s specification (pg. 17, next to last paragraph) discloses that the ratio of on time to off time can be varied and depends upon the precursors being used.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN  
May 16, 2005

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800